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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,257	10/20/2003	Mark Beaumont	DB001070-000	2891

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EXAMINER	
HUISMAN, DAVID J	

ART UNIT	PAPER NUMBER
2183	

MAIL DATE	DELIVERY MODE
10/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/689,257	BEAUMONT, MARK	
	Examiner	Art Unit	
	David J. Huisman	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *see attached* .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-20 and 26 have been examined.

Papers Submitted

2. It is hereby acknowledged that the following papers have been received and placed of record in the file: Amendment as received on 8/24/2007

Specification

3. The abstract of the disclosure is objected to because the expressions should be separated using commas or semicolons. Correction is required. See MPEP § 608.01(b).

4. The disclosure is objected to because of the following informalities: On page 3, please separate the expressions with either commas or semicolons.

Appropriate correction is required.

Claim Objections

5. Claims 3 and 13 are objected to because of the following informalities: Please separate the expressions with either commas or semicolons. Appropriate correction is required.

Withdrawn Rejections

6. Applicant, by way of amendment, has overcome the prior art rejections set forth in the previous Office Action. Consequently, these rejections are hereby withdrawn by the examiner. However, upon further consideration, a new ground(s) of rejection is applied below.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-7, 9-17, 19-20, and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Kirsch, U.S. Patent Application Publication No. US 20040054870 A1.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

9. Referring to claim 1, Kirsch has taught a method for transposing data in a plurality of processing elements arranged in an NxN array, where N is greater than three (see Fig.8a, Fig.8b, and paragraphs [0162]-[0164]), comprising:

a) shifting the data N-1 times along a plurality of diagonals of the plurality of processing elements until each processing element in each of said plurality of diagonals has received the data held by every other processing element in that diagonal. The examiner believes that the manner in which Kirsch anticipates this limitation is best illustrated using a visual example.

Modeled after Fig.8b of Kirsch, an 8x8 (N = 8) array populated with data (serving as both cell number and data value) is as follows:

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

For this particular array, the examiner asserts that there are a plurality of diagonals: a first diagonal including the lightly-shaded cells (data 0, 9, 18, and 27), and a second diagonal including the darker cells (data 36, 45, 54, and 63). The data values 0 and 63, in a transpose operation, will be reversed so that data value 0 is stored in the lower-right cell and 63 is stored in the upper-left cell (note that a transpose may occur in the other direction as well). In the case of data value 0, as shown in Fig.8a of Kirsch (as data value 'A'), data value 0 is shifted N-1 (i.e., seven) times along both diagonals (it travels through both) until each element in each diagonal has held data held by every other element in that diagonal. That is, before shifting, only cell 0 has held data value 0. After the first shift, both cell 0 and cell 9 have held data value 0. After the second shift, cells 0, 9, and 18 have all held data value 0. And, after the third shift, cells 0, 9, 18,

and 27 have all held data value 0. Consequently, it can be seen that each processing element in that 4-element diagonal received data held by every other element in that diagonal (namely, data value 0). A similar argument applies to the second diagonal with data value 63. As it is shifted "northwest", each element in the second diagonal holds data held by every other element in that diagonal (namely, data value 63).

b) selecting data as final output data based on a processing element's position. Clearly, looking at Figs.8a-8b of Kirsch, the element that originally holds value 0 should hold value 63 at the end of the transpose. The receiving of value 63, for instance, by the element in row 0, column 0, is the selection of that value by that element. It is further selected when it is outputted, as a value cannot be outputted unless it is first obtained/selected from memory or bus, or some other location. When it is finally selected, value 63 is outputted as the final data in the transpose.

10. Referring to claim 2, Kirsch has taught the method of claim 1 additionally comprising one of loading an initial count into each processing element and calculating an initial count locally based on the processing element's location, said selecting being responsive to said initial count. See Fig.8b and paragraphs [0164]-[0167].

11. Referring to claim 3, Kirsch has taught the method of claim 2 wherein said initial count is given by one of the following expressions: (x+y+1) MOD (N), (C+R+1) MOD (N), (C+y+1) MOD (N), or (x+R+1) MOD (N) where R and x are numbers indicating a row and a position in the row of a processing element and C and y are numbers indicating a column and a position in the column of a processing element, respectively. See Fig.8b and paragraph [0166], and note the counter calculation of (C+R+1) mod (N).

12. Referring to claim 4, Kirsch has taught the method of claim 2 additionally comprising maintaining a current count in each processing element, said current count being responsive to said initial count and the number of data shifts performed, said selecting being responsive to said current count. See paragraph [0164].

13. Referring to claim 5, Kirsch has taught the method of claim 4 wherein said maintaining a current count includes altering said initial count at programmable intervals by a programmable amount. See paragraph [0164] and note that after each shift, the counter is decremented. So it is decremented by a programmable amount (1), and at a programmable interval (the amount of time to process a shift, which is specified by the architecture).

14. Referring to claim 6, Kirsch has taught the method of claim 4 wherein said initial count is decremented in response to said shifting of data to produce said current count. See paragraph [0164].

15. Referring to claim 7, Kirsch has taught the method of claim 4 wherein said selecting occurs when said current count is non-positive. See paragraph [0164].

16. Referring to claim 9, Kirsch has taught the method of claim 1, wherein said shifting includes a combination of vertical and horizontal shifting. See paragraph [00163] and note that diagonal shifting comprises row (horizontal) and column (vertical) shifting.

17. Referring to claim 10, Kirsch has taught the method of claim 1 wherein said shifting includes a combination of shifting in the x and z directions. See Fig.8a and note, for example, that the value 'A' is shifted to locations one column over (horizontal/x shift) and one row down (vertical/z shifting) from its previous location. Horizontal and vertical (and x and z) are perpendicular directions (they form right angles with one another).

18. Referring to claim 11, Kirsch has taught a method for transposing data in an array of processing elements, comprising:

a) shifting the data along a plurality of diagonals in the array a number of times equal to N-1 where N equals the size of an edge of the array and is greater than three. The examiner believes that the manner in which Kirsch anticipates this limitation is best illustrated using a visual example. Modeled after Fig.8b of Kirsch, an 8x8 (N = 8) array populated with data (serving as both cell number and data value) is as follows:

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

For this particular array, the examiner asserts that there are a plurality of diagonals: a first diagonal including the lightly-shaded cells (data 0, 9, 18, and 27), and a second diagonal including the darker cells (data 36, 45, 54, and 63). The data values 0 and 63, in a transpose operation, will be reversed so that data value 0 is stored in the lower-right cell and 63 is stored in the upper-left cell (note that a transpose may occur in the other direction as well). In the case of

data value 0, as shown in Fig.8a of Kirsch (as data value 'A'), data value 0 is shifted N-1 (i.e., seven) times along both diagonals (it travels through both) until it reaches its final destination. b) outputting data from each processing element as a function of that element's position in a diagonal. See Figs.8a-8b and paragraph [0164]. Clearly, when the lower-right cell finally holds the data originally found in the upper-left cell, the value is outputted as the final data in the transpose.

19. Referring to claim 12, Kirsch has taught the method of claim 11. Furthermore, claim 12 is rejected for the same reasons set forth in the rejection of claim 2.

20. Referring to claim 13, Kirsch has taught the method of claim 12. Furthermore, claim 13 is rejected for the same reasons set forth in the rejection of claim 3.

21. Referring to claim 14, Kirsch has taught the method of claim 12. Furthermore, claim 14 is rejected for the same reasons set forth in the rejection of claim 4.

22. Referring to claim 15, Kirsch has taught the method of claim 14. Furthermore, claim 15 is rejected for the same reasons set forth in the rejection of claim 5.

23. Referring to claim 16, Kirsch has taught the method of claim 14. Furthermore, claim 16 is rejected for the same reasons set forth in the rejection of claim 6.

24. Referring to claim 17, Kirsch has taught the method of claim 16. Furthermore, claim 17 is rejected for the same reasons set forth in the rejection of claim 7.

25. Referring to claim 19, Kirsch has taught the method of claim 11. Furthermore, claim 19 is rejected for the same reasons set forth in the rejection of claim 9.

26. Referring to claim 20, Kirsch has taught the method of claim 11 wherein said shifting includes a combination of shifting in perpendicular directions. See Fig.8a and note, for example,

that the value 'A' is shifted to locations one column over (horizontal/x shift) and one row down (vertical/z shifting) from its previous location. Horizontal and vertical (and x and z) are perpendicular directions (they form right angles with one another).

27. Referring to claim 26, Kirsch has taught a computer-readable memory device carrying an ordered set of instruction which, when executed, perform a method (note that this is deemed inherent as all processing elements execute instructions stored on some computer-readable medium) comprising:

a) shifting data N-1 times along a plurality of diagonals of a plurality of processing elements in an NxN array where N is greater than three until each processing element in each of said plurality of diagonals has received the data held by every other processing element in that diagonal. The examiner believes that the manner in which Kirsch anticipates this limitation is best illustrated using a visual example. Modeled after Fig.8b of Kirsch, an 8x8 (N = 8) array populated with data (serving as both cell number and data value) is as follows:

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63

For this particular array, the examiner asserts that there are a plurality of diagonals: a first diagonal including the lightly-shaded cells (data 0, 9, 18, and 27), and a second diagonal including the darker cells (data 36, 45, 54, and 63). The data values 0 and 63, in a transpose operation, will be reversed so that data value 0 is stored in the lower-right cell and 63 is stored in the upper-left cell (note that a transpose may occur in the other direction as well). In the case of data value 0, as shown in Fig.8a of Kirsch (as data value 'A'), data value 0 is shifted N-1 (i.e., seven) times along both diagonals (it travels through both) until each element in each diagonal has held data held by every other element in that diagonal. That is, before shifting, only cell 0 has held data value 0. After the first shift, both cell 0 and cell 9 have held data value 0. After the second shift, cells 0, 9, and 18 have all held data value 0. And, after the third shift, cells 0, 9, 18, and 27 have all held data value 0. Consequently, it can be seen that each processing element in that 4-element diagonal received data held by every other element in that diagonal (namely, data value 0). A similar argument applies to the second diagonal with data value 63. As it is shifted "northwest", each element in the second diagonal holds data held by every other element in that diagonal (namely, data value 63).

b) selecting data as final output data based on a processing element's position. Clearly, looking at Figs.8a-8b of Kirsch, the element that originally holds value 0 should hold value 63 at the end of the transpose. The receiving of value 63, for instance, by the element in row 0, column 0, is the selection of that value by that element. It is further selected when it is outputted, as a value cannot be outputted unless it is first obtained/selected from memory or bus, or some other location. When it is finally selected, value 63 is outputted as the final data in the transpose.

Claim Rejections - 35 USC § 103

28. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

29. Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kirsch.

30. Referring to claim 8, Kirsch has taught the method of claim 1. As is evident from paragraph [0164] and Fig.8b, Kirsch has further taught maintaining a local count including setting a counter to a first known value, and counting down from said first known value based on a number of shifts that have been performed, said selecting occurring when a current count equals a target count. Kirsch not taught counting up as claimed by applicant. However, the examiner asserts that counting down and counting up are equivalent in all aspects except for the counting direction. That is, whether a system initializes a counter to 7 and counts down until it equals 0 or whether a system initializes a counter to 0 and counts up until it equals 7, the end result will be the same in both cases. Counting down and counting up have been done by prior art mechanism and because they may be used for the same purpose, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kirsch to count up instead of count down to realize selection. Again, one would have been motivated to make such a combination because one of ordinary skill in the art would have recognized that one may be substituted for the other without sacrificing functionality.

31. Referring to claim 18, Kirsch has taught the method of claim 12. Furthermore, claim 18 is rejected for the same reasons set forth in the rejection of claim 8.

Response to Arguments

32. Applicant's arguments with respect to claims 1-20 and 26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

33. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant is reminded that in amending in response to a rejection of claims, the patentable novelty must be clearly shown in view of the state of the art disclosed by the

references cited and the objections made. Applicant must also show how the amendments avoid such references and objections. See 37 CFR § 1.111(c).

Pechanek et al., U.S. Patent No. 6,023,753, has taught a prior art torus array implementation for performing matrix transposition. It should be noted that this prior art is similar in operation to the applied Kirsch reference above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David J. Huisman whose telephone number is (571) 272-4168. The examiner can normally be reached on Monday-Friday (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJH
David J. Huisman
October 9, 2007